

What is claimed is:

1. A method for operating an atomic clock comprising the steps of:
generating atoms in a ground-state sublevel of maximum or minimum spin from
which end resonances can be excited; and
5 exciting magnetic resonance transitions in the atoms with magnetic fields
oscillating at Bohr frequencies of the end resonances.
2. The method of claim 1 wherein the magnetic field oscillates at the Bohr
frequency ω_- of the resonance.
- 10 3. The method of claim 1 wherein the magnetic field oscillates at the Bohr
frequency ω_+ of the resonance.
4. The method of claim 1 wherein said atoms are rubidium atoms or cesium
15 atoms.
5. The method of claim 4 wherein the atoms are pumped with circularly
polarized, D1 resonance light for the rubidium or cesium atoms.
- 20 6. A method for operating an atomic clock comprising the steps of:
generating atoms in a ground-state sublevel of maximum or minimum spin; and
pumping the atoms with light modulated at a Bohr frequency of the end resonance
for exciting transitions in the atoms.
- 25 7. The method of claim 6 wherein the light is modulated at the Bohr frequency ω_-
of the resonance.
8. The method of claim 6 wherein the light is modulated at the Bohr frequency
 ω_+ of the resonance.

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9. The method of claim 6 wherein said atoms are rubidium atoms or cesium atoms.

10. The method of claim 6 wherein the atoms are pumped with modulated, 5 circularly polarized, D1 resonance light for the Rb or Cs atoms.

11. A system for operating an atomic clock comprising:
means for generating atoms in a ground-state sublevel of maximum or minimum spin from which end resonances can be excited; and
10 means for generating hyperfine transitions of said atoms by applying magnetic fields oscillating at Bohr frequencies of the end resonances.

12. The system of claim 11 wherein the magnetic field oscillates at the Bohr frequency ω_- of the resonance.

15 13. The system of claim 11 wherein the magnetic field oscillates at the Bohr frequency ω_+ of the resonance.

14. The system of claim 11 wherein said atoms are rubidium atoms or cesium 20 atoms.

15. The system of claim 14 wherein the atoms are pumped with circularly polarized, D1 resonance light for the rubidium or cesium atoms.

25 16. A system for operating an atomic clock comprising:
means for generating atoms in a ground-state sublevel of maximum or minimum spin, from which end resonances can be excited; and
means for pumping the atoms with light modulated at a Bohr frequency of the end resonance for exciting transitions in the atoms.

17. The system of claim 16 wherein the light is modulated at the Bohr frequency ω_- of the resonance.

18. The system of claim 16 wherein the light is modulated at the Bohr frequency
5 ω_+ of the resonance.

19. The system of claim 12 wherein said atoms are rubidium atoms or cesium
atoms.

10 20. The system of claim 19 wherein the atoms are pumped with modulated,
circularly polarized, D1 resonance light for the rubidium or cesium atoms.

15 21. A method for operating a magnetometer comprising the steps of:
generating atoms in a ground-state sublevel of maximum or minimum spin from
which end resonances can be excited; and
exciting magnetic resonance transitions in the atoms with magnetic fields
oscillating at Bohr frequencies of the end resonances.

20 22. The method of claim 21 wherein the magnetic field oscillates at the Bohr
frequency ω_- of the resonance.

23. The method of claim 21 wherein the magnetic field oscillates at the Bohr
frequency ω_+ of the resonance.

25 24. The method of claim 21 wherein said atoms are rubidium atoms or cesium
atoms.

25. The method of claim 24 wherein the atoms are pumped with circularly
polarized, D1 resonance light for the rubidium or cesium atoms.

26. A method for operating a magnetometer comprising the steps of: generating atoms in a ground-state sublevel of maximum or minimum spin; and pumping the atoms with light modulated at a Bohr frequency of the end resonance for exciting transitions in the atoms.

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27. The method of claim 26 wherein the light is modulated at the Bohr frequency ω_- of the resonance.

10 28. The method of claim 26 wherein the light is modulated at the Bohr frequency ω_+ of the resonance.

29. The method of claim 26 wherein said atoms are rubidium atoms or cesium atoms.

15 30. The method of claim 29 wherein the atoms are pumped with modulated, circularly polarized, D1 resonance light for the rubidium or cesium atoms.

20 31. A system for operating a magnetometer comprising: means for generating atoms in a ground-state sublevel of maximum or minimum spin from which end resonances can be excited; and means for generating hyperfine transitions of said atoms by applying magnetic fields oscillating at Bohr frequencies of the end resonances.

25 32. The system of claim 31 wherein the magnetic field oscillates at the Bohr frequency ω_- of the resonance.

33. The system of claim 31 wherein the magnetic field oscillates at the Bohr frequency ω_+ of the resonance.

30 34. The system of claim 31 wherein said atoms are rubidium atoms or cesium atoms.

35. The system of claim 31 wherein the atoms are pumped with circularly polarized, D1 resonance light for the rubidium or cesium atoms.

5 36. A system for operating a magnetometer comprising:
means for generating atoms in a ground-state sublevel of maximum or minimum spin, from which end resonances can be excited; and
means for pumping the atoms with light modulated at a Bohr frequency of the end resonance for exciting transitions in the atoms.

10 37. The system of claim 36 wherein the light is modulated at the Bohr frequency ω_- of the resonance.

15 38. The system of claim 36 wherein the light is modulated at the Bohr frequency ω_+ of the resonance.

39. The system of claim 36 wherein said atoms are rubidium atoms or cesium atoms.

20 40. The system of claim 36 wherein the atoms are pumped with modulated, circularly polarized, D1 resonance light for the rubidium or cesium atoms.